

ABSTRACT

A process and structure for copper damascene interconnects including a tungsten-nitride (WN_2) barrier layer formed by atomic layer deposition is disclosed. The process method includes of forming a copper damascene structure by forming a
5 first opening through a first insulating layer. A second opening is formed through a second insulating layer which is provided over the first insulating layer. The first opening being in communication with the second opening. A tungsten-nitride (WN_2) layer is formed in contact with the first and second openings. And, a copper layer is provided in the first and second openings. Copper is selectively deposited
10 using a selective electroless deposition technique at low temperature to provide improved interconnects having lower electrical resistivity and more electro/stress-migration resistance than conventional interconnects. Additionally, metal adhesion to the underlying substrate materials is improved and the amount of associated waste disposal problems is reduced.

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